

# The USGS/BLM Baseline Environmental Report and Habitat Disturbance



**MT Sage-Grouse Advisory  
Council  
July 16, 2013**

# Outline for Today

- Background (Why)
  - Impacts of disturbance on sage-grouse
  - Habitat selection scales
- Baseline Environmental Report (What)
  - Purpose and scope
  - Use by BLM and USFS
- Disturbance Monitoring (How)
  - Measures of disturbance
  - Broad scale monitoring for disturbance





# Threats to Greater Sage-Grouse

## Factor A - Identified by the FWS

1. Habitat Conversion to Agriculture
2. Urbanization
3. Infrastructure
4. Fire
5. Invasive Plants
6. Conifer Encroachment
7. Overgrazing
8. Energy
9. Climate Change
- Other:*
  10. Habitat Frag
  11. Treat & Rx Fire
  12. Other Land Uses



# 2010 FWS Listing Decision

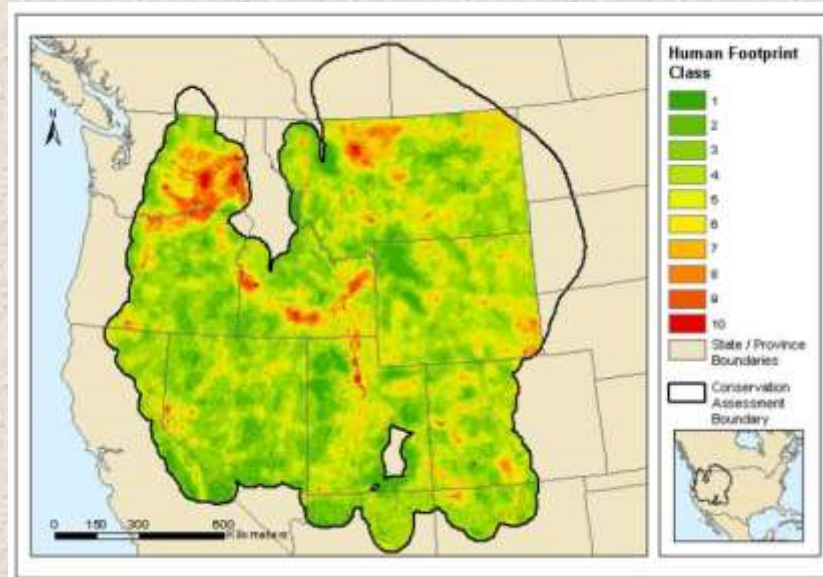
- Factor A analysis
  - “habitat conversion for agriculture, urbanization, infrastructure; fire, invasive plants, pinyon-juniper woodland encroachment, grazing, energy development, and climate change **are all contributing, individually and collectively**”
  - they are not at a level that is causing a threat to greater sage-grouse everywhere within its range.
- “**With continued habitat destruction** and modification, resulting in fragmentation and diminished connectivity, greater **sage-grouse populations will likely decline in size and become more isolated**, making them more vulnerable to further reduction over time and increasing the risk of extinction.”





# Lek count decline

- Index of “human footprint” to assess and compare levels of use expressed on a 1 to 10 scale
- Includes
  - human habitation, highways and roads, railroads, power lines, agricultural lands, campgrounds, rest stops, landfills, oil and gas developments, human-induced fires
- Across the sage-grouse range, **lek count declines were measurable when human-footprint scores exceeded “2” at lek sites and when scores exceeded “3” within either 5 km or 18 km (3.1 or 11.2 mi) of a lek**



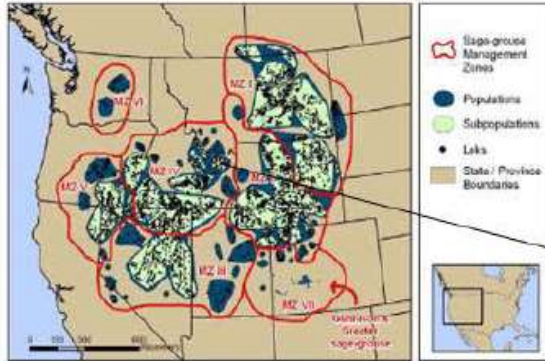
# Occupied vs. Extirpated Range

- Comparison of 22 variables
  - Biotic = sagebrush characteristics
  - Abiotic = precip, elevation, soils
  - Anthropogenic = agriculture, infrastructure, energy
- 15 of 22 significant
- Best predictions come from a mix of variables
  - Large patches of sagebrush
  - Fewer disturbances, farther from infrastructure
- No silver bullet – impacts at multiple scales

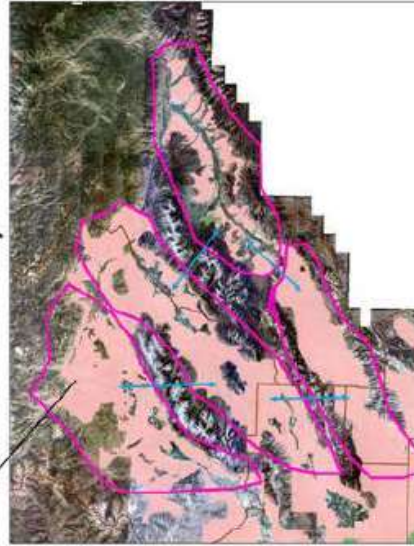
Wisdom et. al 2011 (Chapter 18 in SAB)



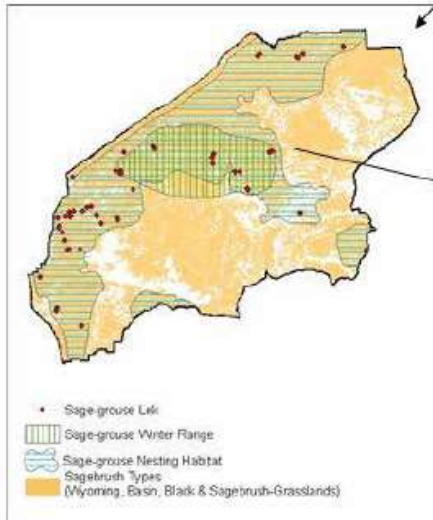
First Order Selection:  
*Species and population range*



Second Order Selection:  
*Subpopulation areas, dispersal between sub-populations*



Third Order Selection:  
*Home-range of small/isolated populations, sub-populations, or group of birds associated with a cluster of leks, movement between seasonal ranges (breeding to summer).*



Fourth Order Selection:  
*Seasonal habitats, movement between daily use areas (feeding to roosting, nesting to feeding, feeding to loafing).*





Sage-grouse have **habitat requirements** that can be **recognized at multiple scales** with the broadest transcending traditional management boundaries.

**An area has suitable habitat if it**

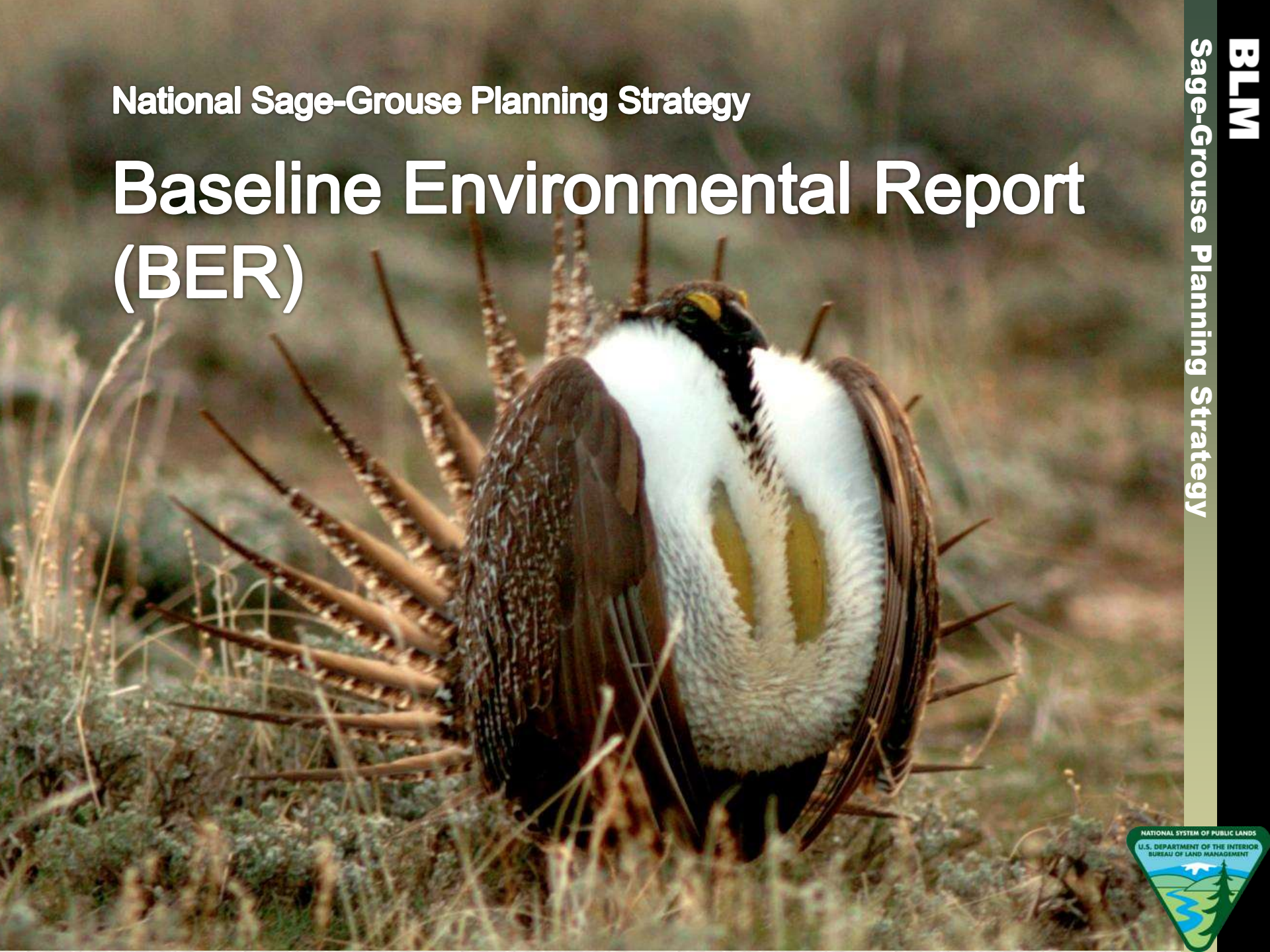
- (a) is large with contiguous acres of sagebrush;**
- (b) contains a mosaic of sagebrush, grass, and forb cover**, which provides suitable cover and forage opportunities (good condition) within proximity to allow seasonal movement and use;
- (c) contains healthy, productive, and sufficiently isolated (safe) local habitats that provide specific seasonal requirements; and**
- (d) has sufficient specific microsite conditions that provide daily needs such as nest sites.**





National Sage-Grouse Planning Strategy

# Baseline Environmental Report (BER)



# Baseline Environmental Report (BER)

- Threats are not equally distributed across the landscape so:
  - Quantify and identify where they are
  - How do they impact sage-grouse habitat
- Information to understand issues within planning unit
  - **Relative contribution of threats** (planning unit vs. management zone)
  - **Management responsibility** (threat influence across entities)
  - Existing rights and management space
  - What are cumulative impacts (what else is going on outside planning unit)





# What is in the Baseline Report?

- Report
  - For each threat in the FWS listing decision
  - Science behind the impact to sage-grouse and thresholds, indicators, metrics as available
  - Location, magnitude, extent for each management entity within each management zone (PPH vs. PGH)
  - Figures showing location geospatially
  - Summary for each Management Zone of threats, conservation areas, valid existing rights
- Additional available analysis using planning and LUP boundaries



# What the BER is not

- A replacement for localized data and interpretation
- Prediction of future conditions or status
- Management recommendations or prescriptions
- A project level planning tool



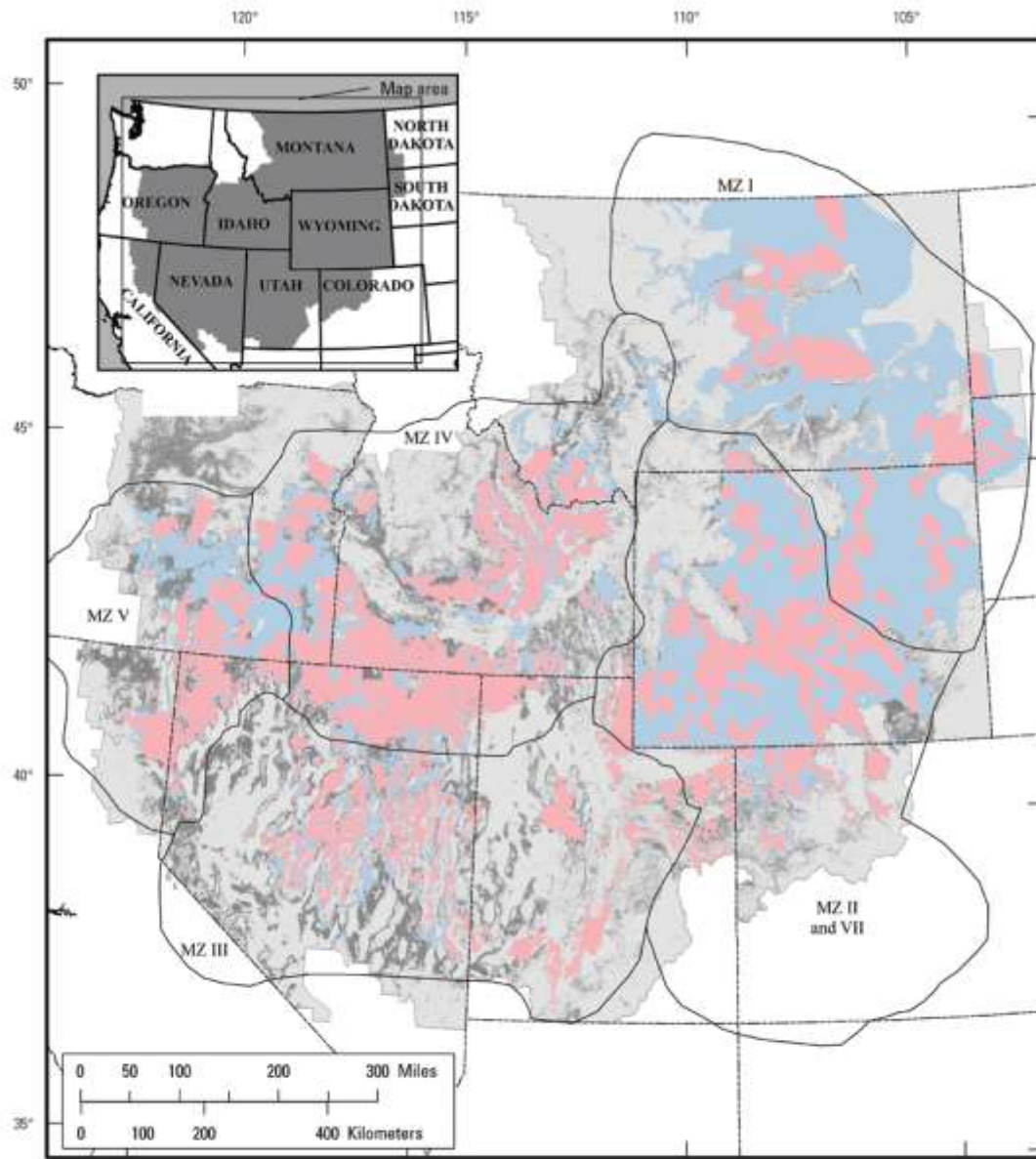


## Summary of Science, Activities, Programs, and Policies That Influence the Rangewide Conservation of Greater Sage-Grouse (*Centrocercus urophasianus*)



Open-File Report 2013–1098

U.S. Department of the Interior  
U.S. Geological Survey

**EXPLANATION**

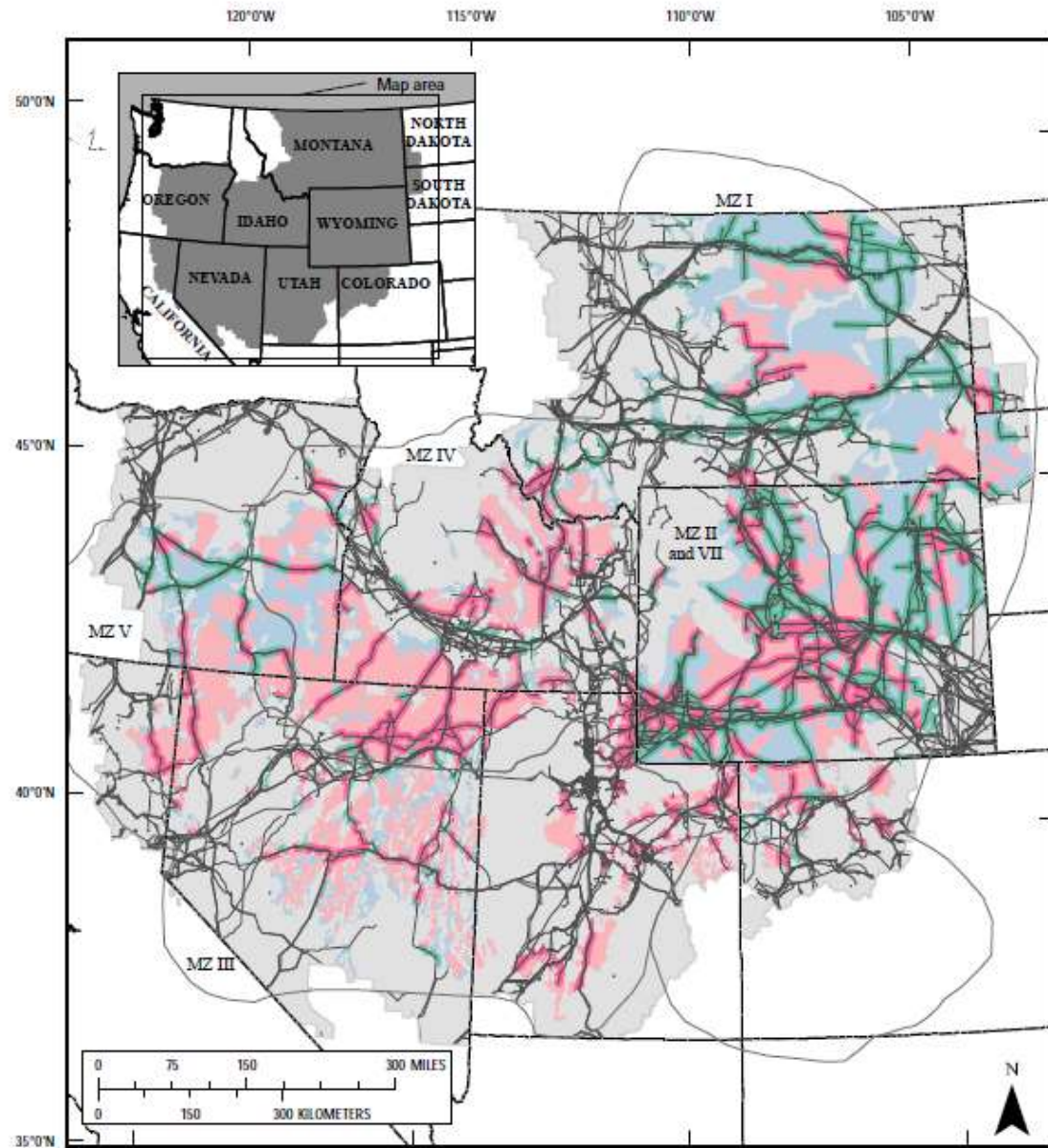
	Preliminary Priority Habitat		Sagebrush
	Preliminary General Habitat		Rangewide study area



## Major Powerlines and Associated Infrastructure - Direct and Indirect Influence on PPH

Management Zone Entity	Sage-grouse PPH (acres)	Direct Footprint (acres)	Indirect Influence, 6.9km (Acres)	Direct Footprint (%)	Relative Influence(%)
<b>MZ I</b>	<b>11,636,400</b>	<b>128,700</b>	<b>3,348,700</b>	<b>1.11%</b>	<b>28.78%</b>
BLM	2,994,300	18,600	601,600	0.62%	18%
Forest Service	292,400	3,800	136,300	1.30%	4%
Tribal and Other Federal	219,700	1,000	34,600	0.46%	1%
Private	7,132,500	92,100	2,280,300	1.29%	68%
State	995,600	13,200	295,600	1.33%	9%
Other	1,900	0	300	0.00%	0%
<b>MZ II and VII</b>	<b>17,476,000</b>	<b>673,800</b>	<b>10,480,800</b>	<b>3.86%</b>	<b>59.97%</b>
BLM	9,021,200	320,500	5,286,400	3.55%	50%
Forest Service	162,000	5,300	91,900	3.27%	1%
Tribal and Other Federal	784,000	13,000	339,900	1.66%	3%
Private	6,233,900	284,400	4,033,300	4.56%	38%
State	1,244,800	48,100	711,200	3.86%	7%
Other	30,100	2,400	18,100	7.97%	0%





## EXPLANATION

## Major Power Lines and Associated Structures



PPH



PGH



Rangewide Study Area



Indirect Influence on PPH



Indirect Influence on PGH

— Major Power Lines

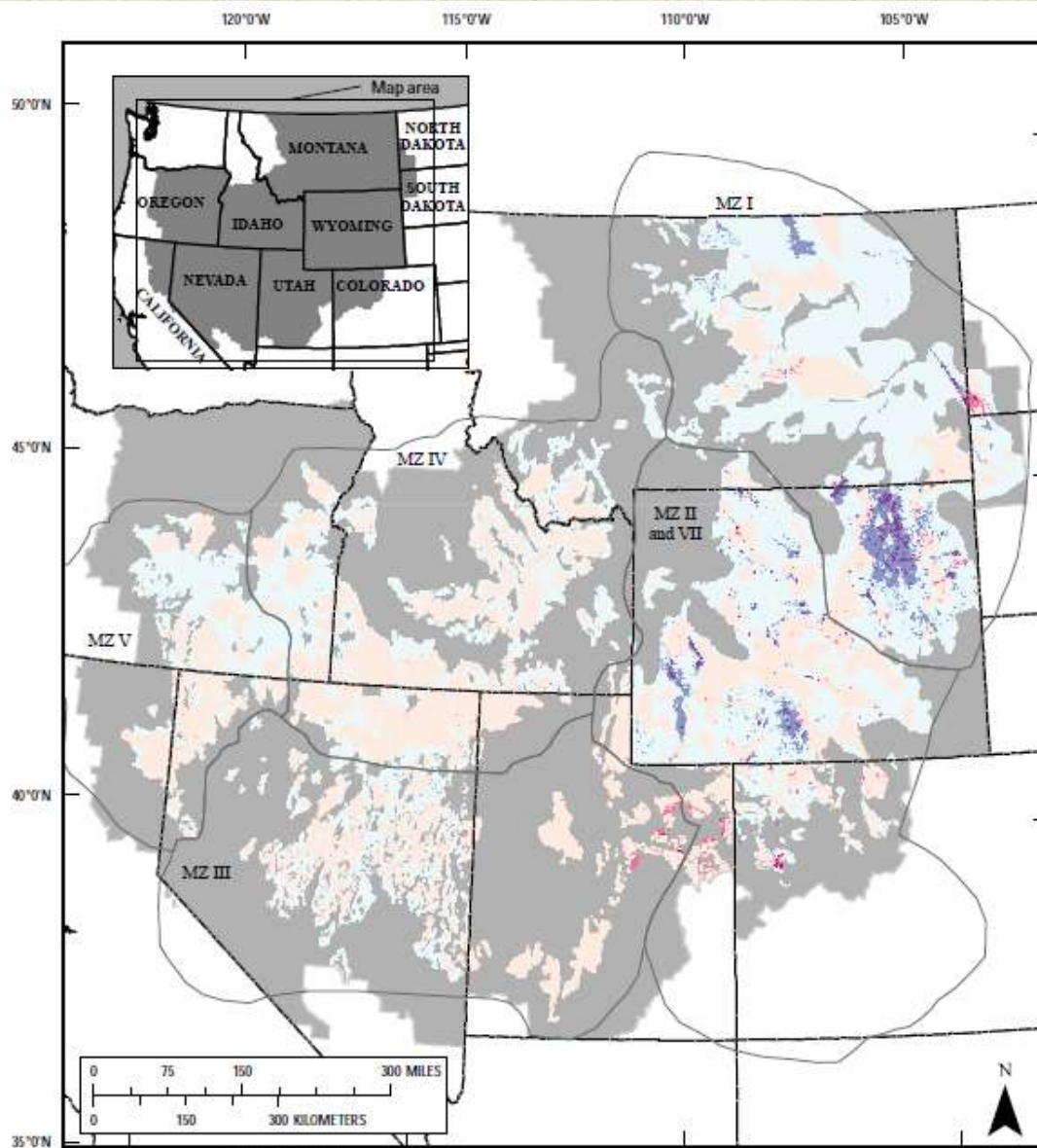
• Associated Structures



# Oil and Gas Well and Pad Locations - Direct and Indirect Influence on PPH

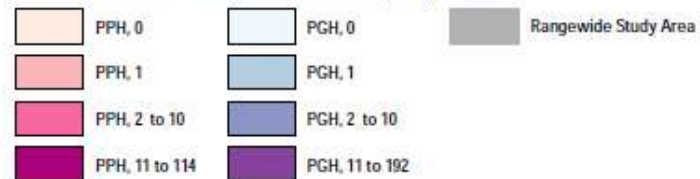
Management Zone Entity	SG Habitat (acres)	Direct Footprint (acres)	19km Indirect Influence (Acres)	Direct Footprint (%)	Relative Influence <sup>1</sup> (%)
<b>MZ I</b>	<b>11,636,400</b>	<b>11,100</b>	<b>6,939,400</b>	<b>0.10%</b>	<b>59.64%</b>
BLM	2,994,300	2,000	1,528,400	0.07%	22%
Forest Service	292,400	400	276,600	0.14%	4%
Tribal and Other Federal	219,700	0	58,400	0.00%	1%
Private	7,132,500	8,000	4,479,200	0.11%	65%
State	995,600	600	595,800	0.06%	9%
Other	1,900	0	1,000	0.00%	0%
<b>MZ II and VII</b>	<b>17,476,000</b>	<b>10,800</b>	<b>13,558,000</b>	<b>0.06%</b>	<b>77.58%</b>
BLM	9,021,200	6,300	7,375,300	0.07%	54%
Forest Service	162,000	0	41,400	0.00%	0%
Tribal and Other Federal	784,000	800	670,200	0.10%	5%
Private	6,233,900	3,100	4,493,600	0.05%	33%
State	1,244,800	700	952,600	0.06%	7%
Other	30,100	0	25,000	0.00%	0%





## EXPLANATION

Producing Oil and Gas Development Related Wells per Square Mile





# Producing Oil and Gas Development Related Wells per Square Mile

Montana Core Areas

COT Priority Areas for Conservation (PACs)

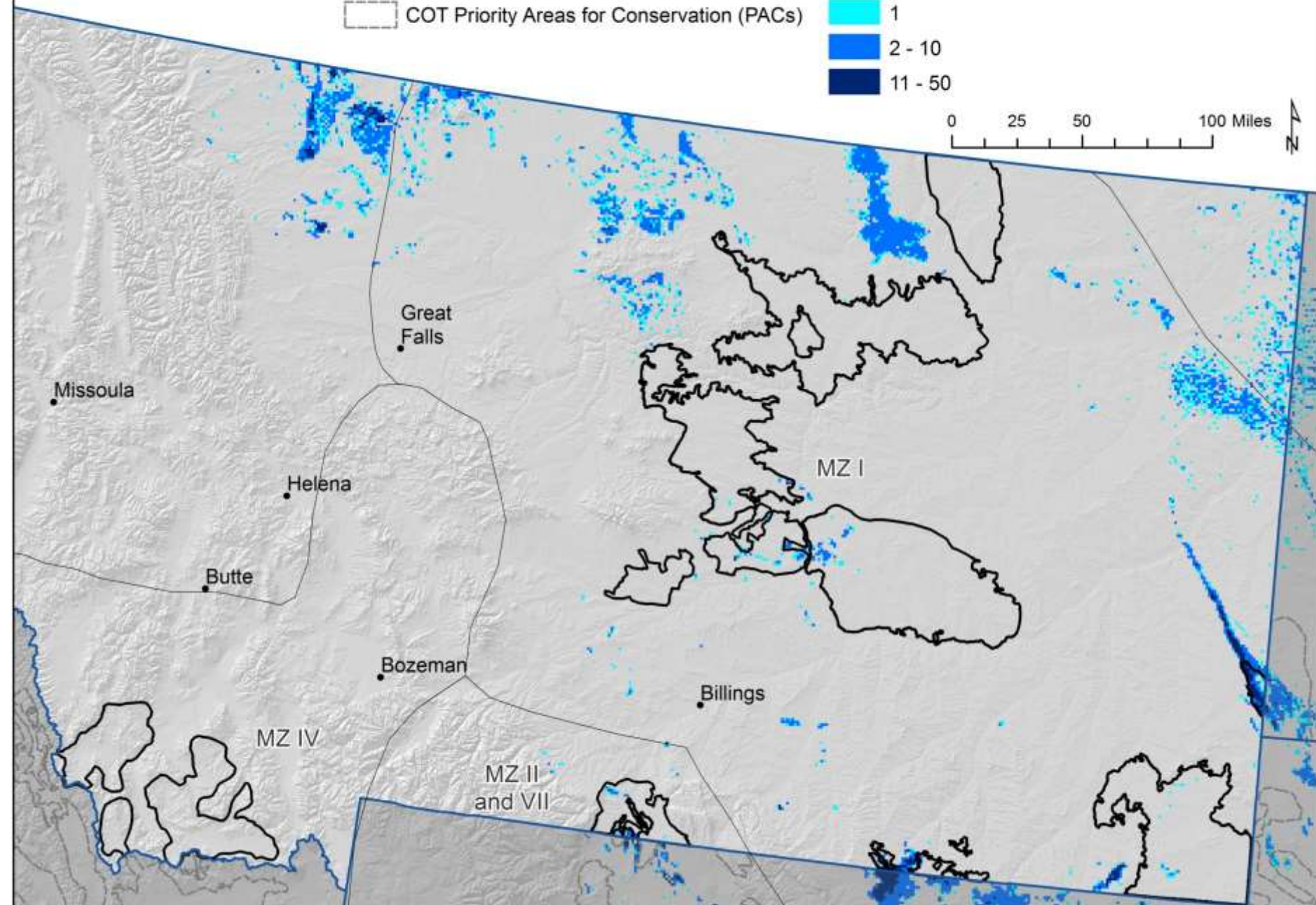
Wells per Square Mile

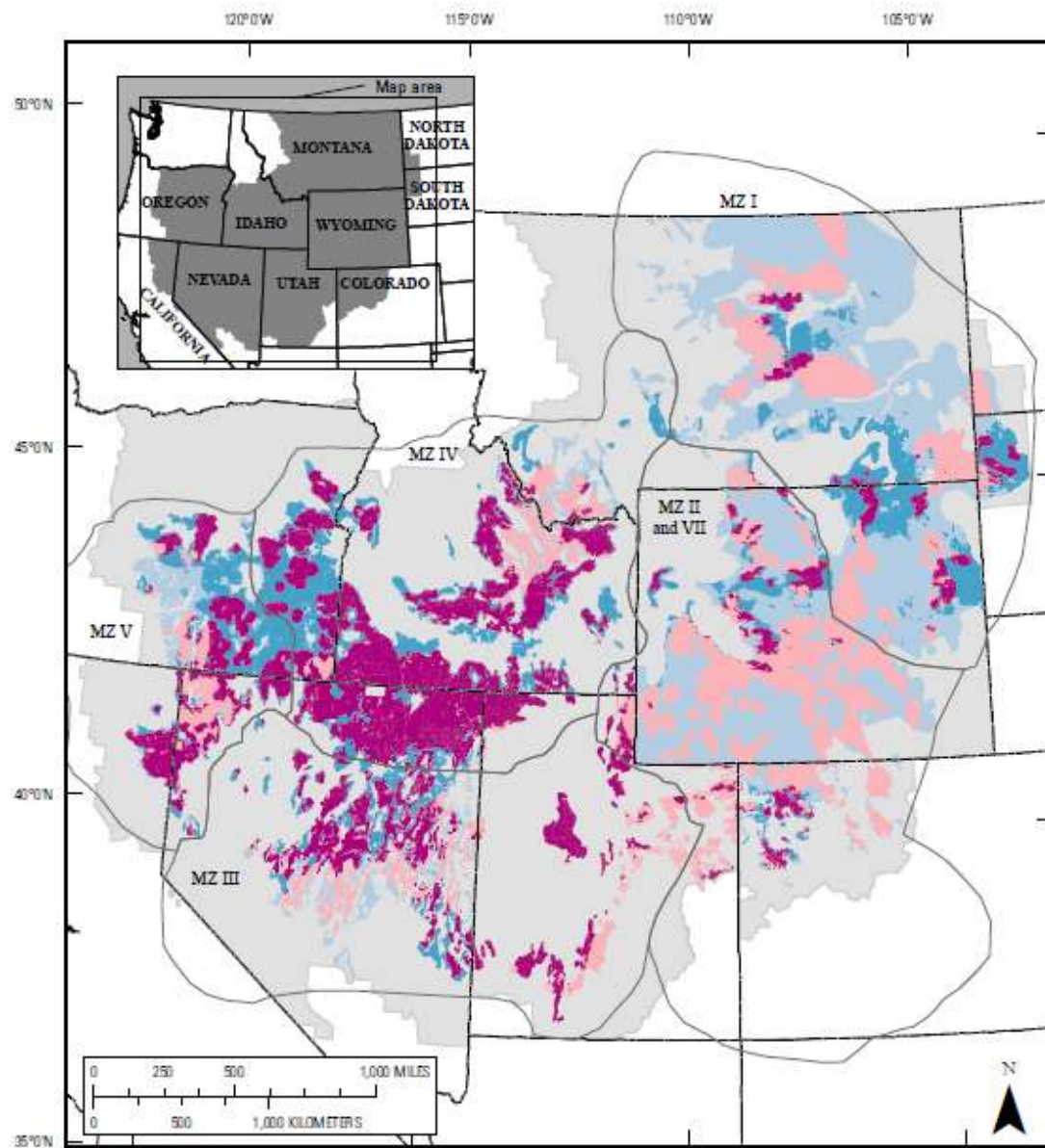
1

2 - 10

11 - 50

0 25 50 100 Miles

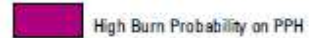


**EXPLANATION**

High Burn Probability



PPH



High Burn Probability on PPH



PGH



High Burn Probability on PGH



Rangewide Study Area



# MZ 1

- A majority (66 percent) of the sagebrush landscape in this MZ is **privately owned**; however, sage-grouse leks in the region remain relatively well connected
- Major threats
  - oil and gas developments
  - conversion of native rangeland to crops
  - Anthropogenic footprint has direct influence <2% (relatively dense compared to western portions of the range )
- Fire risk is generally low; however, isolated areas are identified as having high fire risk
- Cover and productivity of native rangelands are essential for effective conservation of sage-grouse in this region. Limited sagebrush cover (naturally, due to environmental gradients favoring grassland systems) coupled with historic agricultural uses and current energy-production infrastructure make **natural and induced habitat limitations a fundamental, limiting factor for local sage-grouse populations in this region.**



# MZ IV

- A majority (63 percent) of the sagebrush landscape is **Federally managed**
- Primary threats to sage-grouse habitats and populations occurring across populations in MZ IV
  - **Historic conversion of the best sites** (deepest soils) to agriculture
  - **Wildfire** (81 percent of the region is considered at high risk for fire)
  - Cheatgrass
  - Geothermal energy development potential
  - **Infrastructure**
  - Unsustainable livestock grazing (areas not meeting land health standards, although not as prevalent in MT)
- Very few active oil and gas wells (some exploration historically)
- Coal and solar potential are low throughout





# Disturbance conclusions

- Human alterations, uses, and impacts coupled with natural variability (for example, drought) have changed the extent, condition, and distribution of sagebrush-steppe
- Three of the fundamental characteristics of the sagebrush biome that have been altered from presettlement conditions include
  1. the total area of sagebrush shrubland has been reduced;
  2. the composition and structure of the vegetation and soils in sagebrush communities have been changed, including increased abundance and performance of invasive species and decreased abundance and performance of native species
  3. fragmentation created by roads, power lines, fences, energy developments, urbanization, and other anthropogenic features isolate populations by restricting movements or degrading habitat
- Similar effects are seen from types/classes of disturbances
  - Fire, agriculture, etc = Complete loss of blocks of habitat (no longer sagebrush)
  - Roads, energy, infrastructure = spread of exotics, predator movements, avoidance behaviors, noise, that all lead to degradation of the function of habitat





# NEPA Analysis and Cumulative Impacts



# Key Cumulative Impact Questions for Sage-Grouse

- Overall goal: maintain abundance and distribution
  - Where are the priority habitats?
  - What is the baseline level of impact in these areas?
  - How do these areas connect (general habitat)?
- Protect from disturbances that would impact
  - What scales of impact are there?
    - Large areas of sagebrush (removal of large areas of sagebrush)
    - Degradation of sagebrush patches (collective impacts of avoidance, stress, loss of functionality)
    - Localized losses or degradation of microsite condition
  - How to measure disturbance?
  - How do disturbances interact and where are the thresholds?



# Western Watersheds Project vs. Salazar: 9/28/11

- Cumulative impacts in the Pinedale RMP
  - EIS data showed that nearly a third of the allotment acres failed to meet rangeland health standards
  - Oil and gas impacts within the plan was discussed
  - No analysis of O&G development in neighboring plans
  - “There was no discussion of how grazing would ‘synergistically interact’ with energy development to affect the sage grouse”
  - “The cumulative impacts of energy development, grazing, and other factors would be detrimental to sage grouse”
- “the Court finds that the Pinedale EIS failed to conduct a proper cumulative impact analysis and hence violated NEPA”





# **BROAD SCALE DISTURBANCE MONITORING**



# The BER and Disturbance

- Provides west wide layers of current location of threats
  - Course scale
  - Allow for regional comparisons
  - Patterns, context, and prioritization
- Identifies types of impacts, severity, some identification of thresholds (or levels where impacts are likely)





# The Three Measures of Disturbance

- For cumulative impacts we could aggregate threats into the following three general measures:
  1. Percent of sagebrush per unit area
  2. Percent of non-habitat (human footprint) per unit area
  3. Number of energy facilities and mining locations per unit area (density)
- Focus is on higher orders of habitat selection to show context and identify relative impacts
  - Where are higher orders of selection satisfied?
  - At the site level monitoring must consider local conditions, type and level of activity, etc. to understand impact



<b>Geospatial Data Layer</b>	<b>Percent of Sagebrush</b>	<b>Percent of Non-habitat (Human Footprint)</b>	<b>Number of Energy Facilities</b>
<b>Agriculture</b>	X		
<b>Urbanization</b>	X		
<b>Wildfire</b>	X		
<b>Invasive plants</b>	X		
<b>Conifer encroachment</b>	X		
<b>Energy (oil and gas wells and development facilities)</b>		X	X
<b>Energy (coal mines)</b>		X	X
<b>Energy (renewable)</b>		X	X
<b>Mining (active locatable, leasable, and salable developments)</b>		X	
<b>Infrastructure (roads and railroads)</b>		X	
<b>Infrastructure (power lines)</b>		X	
<b>Infrastructure (communication towers)</b>		X	
<b>Infrastructure (other vertical structures)</b>		X	

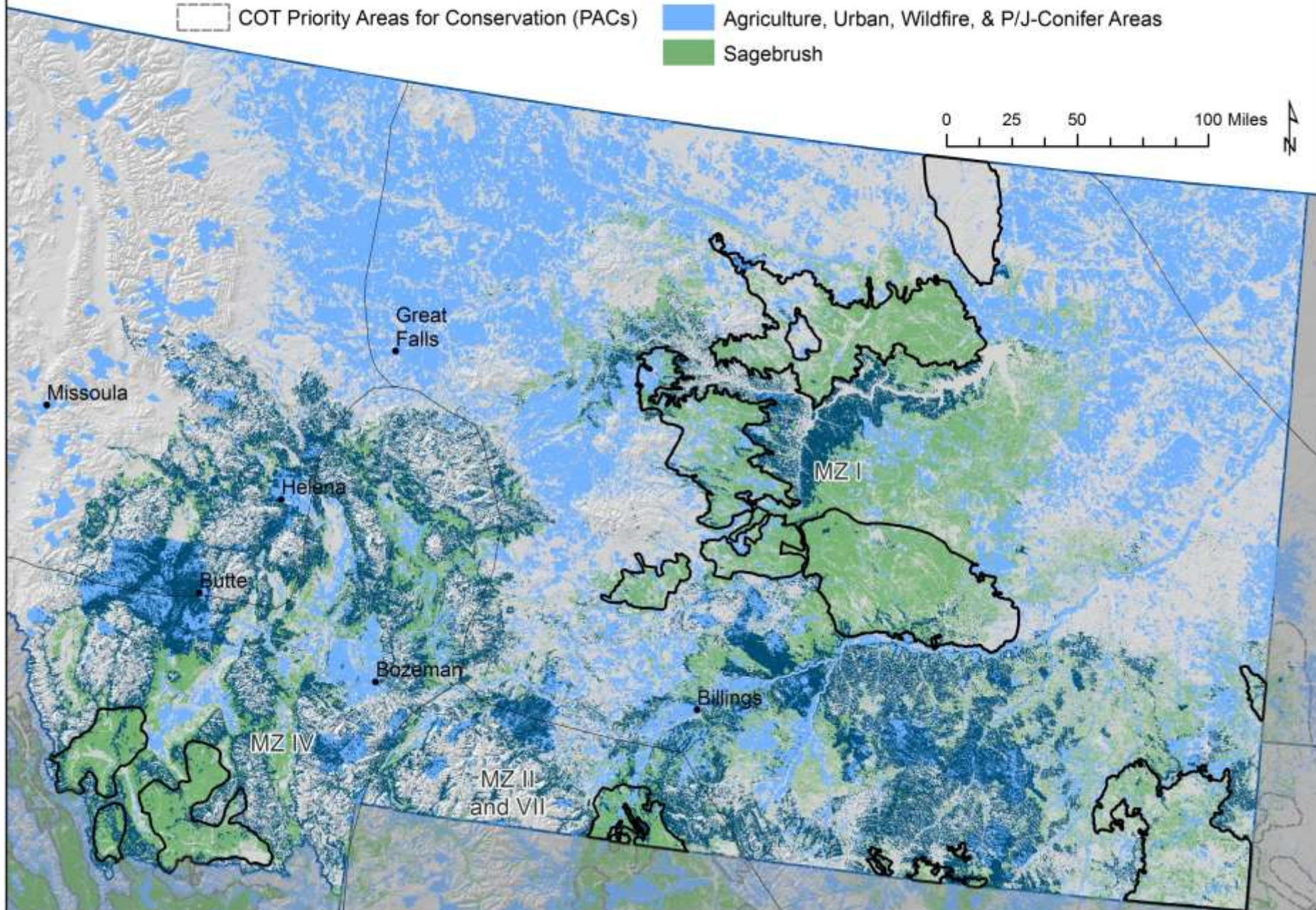




# Sagebrush Disturbance



0 25 50 100 Miles





# Sagebrush Disturbance: Relative Density

Montana Core Areas

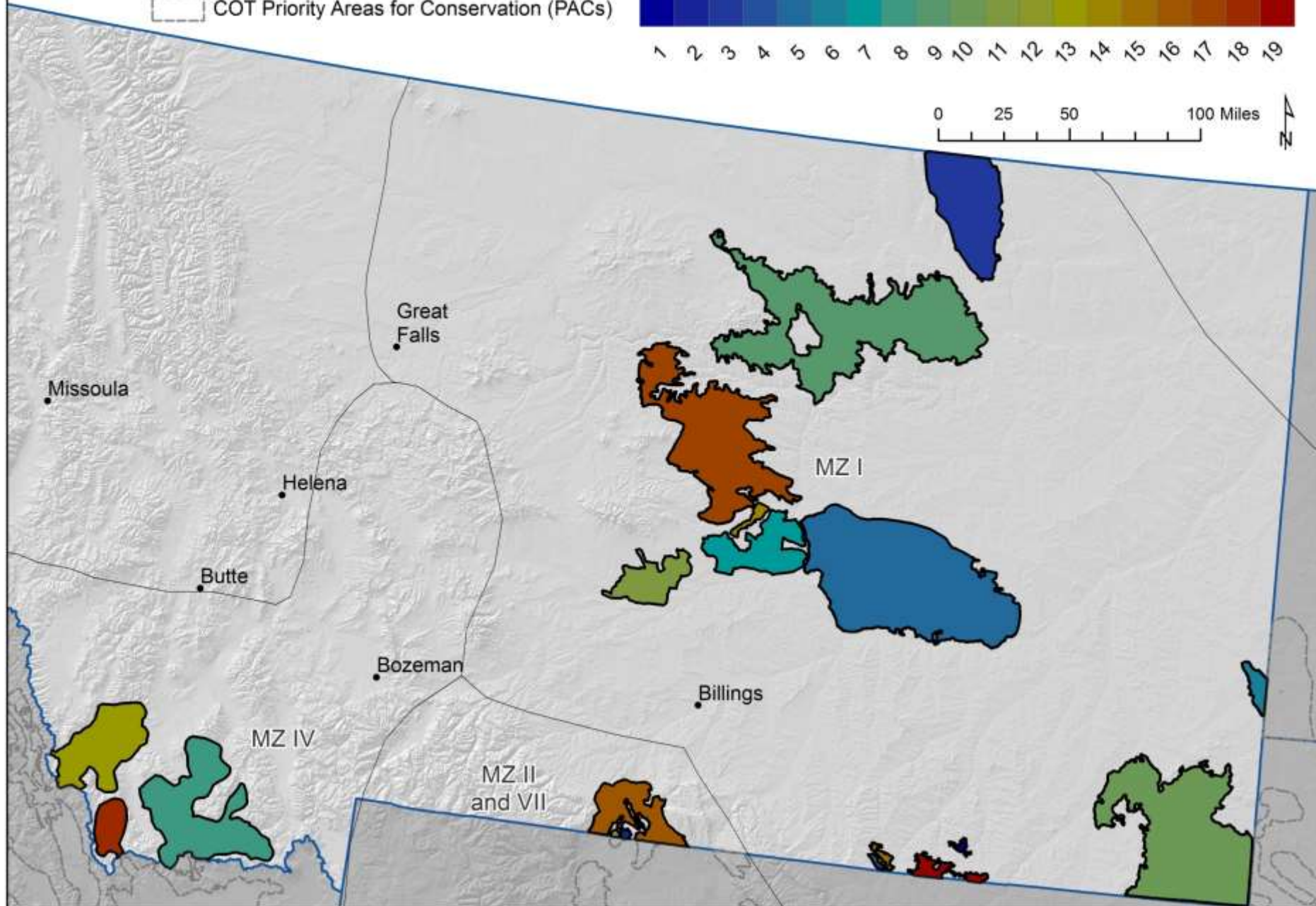
COT Priority Areas for Conservation (PACs)

Agriculture, Urban, Wildfire, & P/J-Conifer Relative Density by MT Core



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

0 25 50 100 Miles





# Habitat Disturbance

Montana Core Areas

COT Priority Areas for Conservation (PACs)

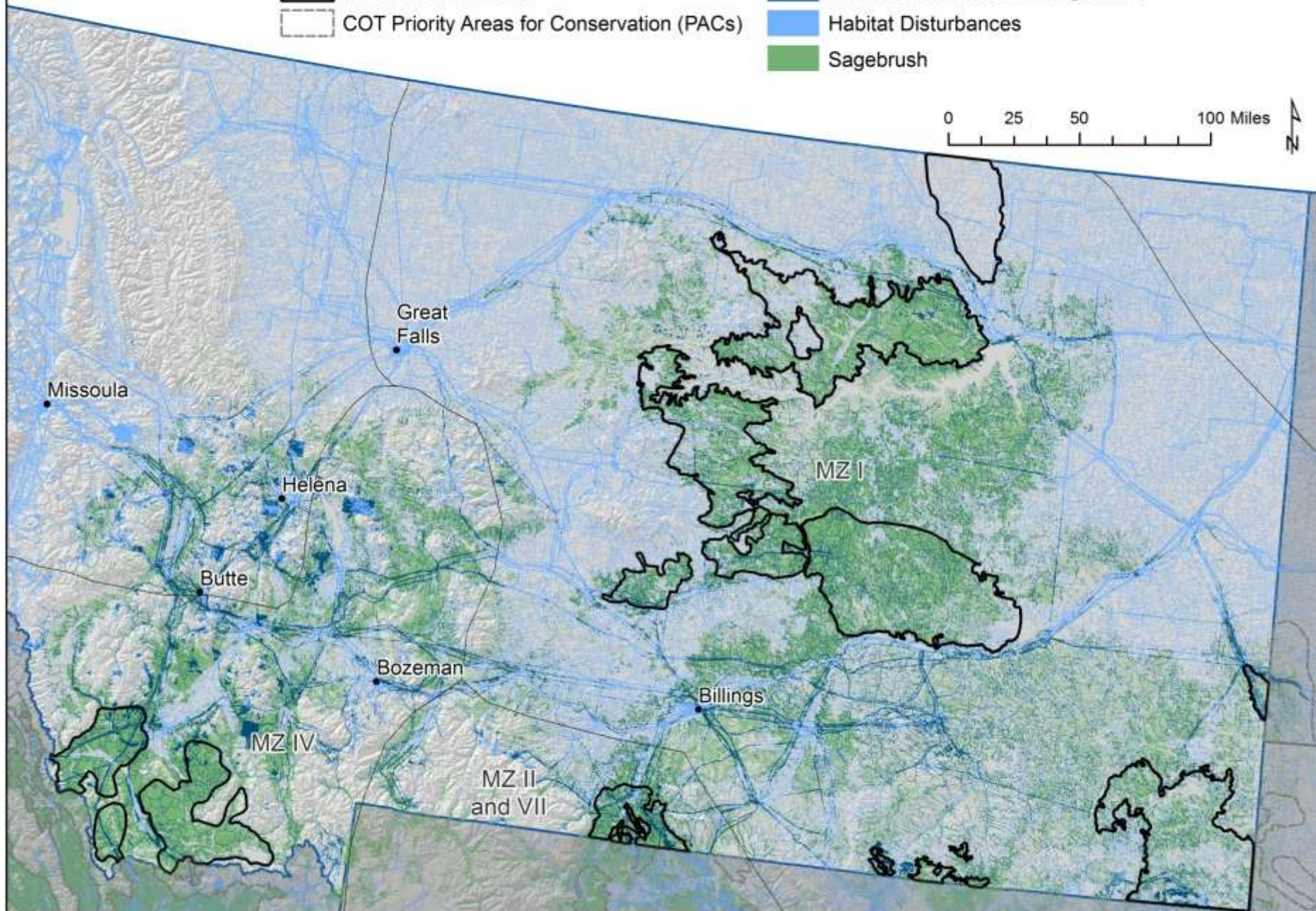
Habitat Disturbance on Sagebrush

Habitat Disturbances

Sagebrush

0 25 50 100 Miles

N





# Habitat Disturbance: Relative Density

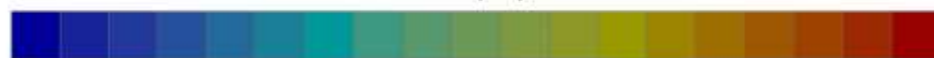


Montana Core Areas



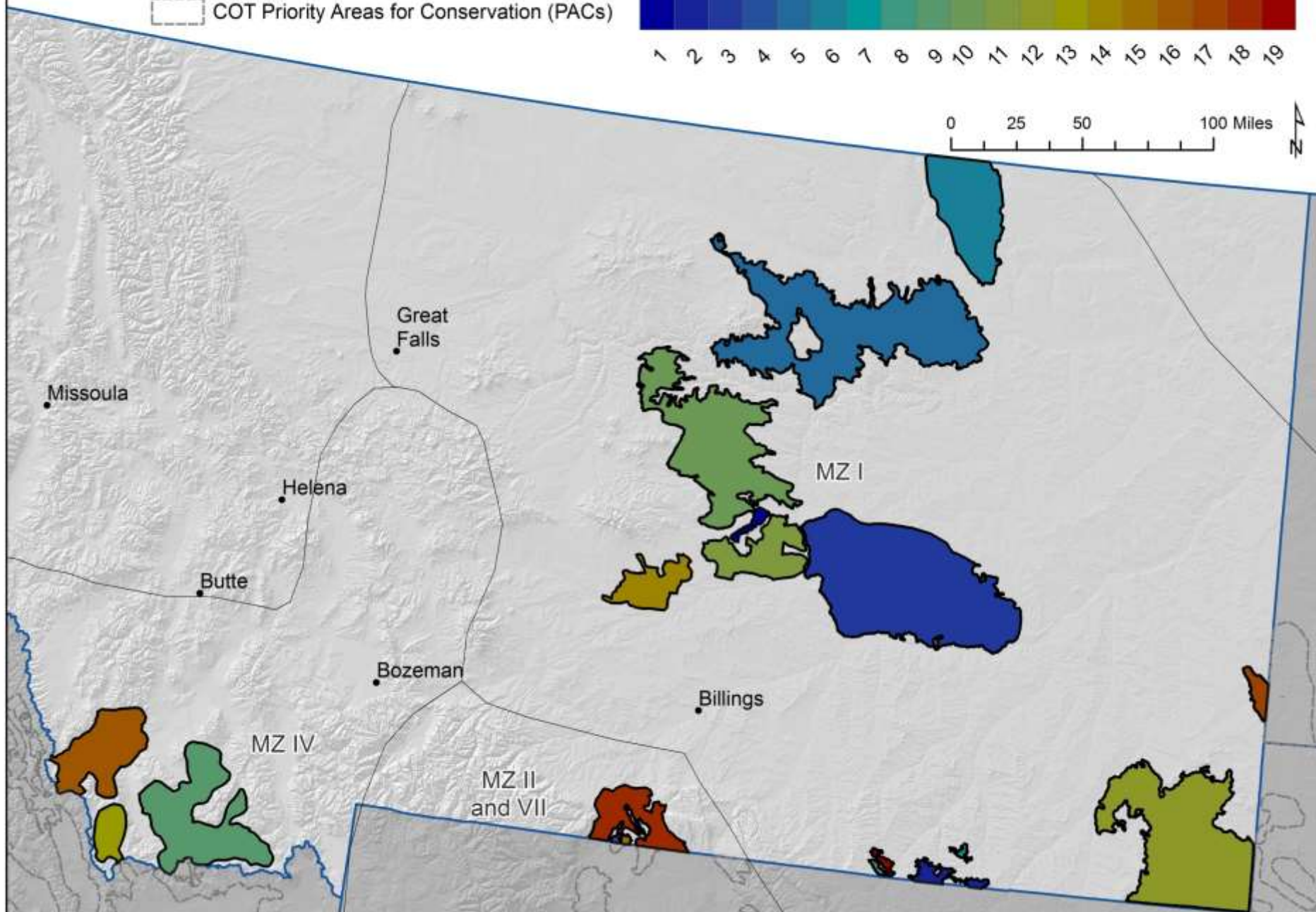
COT Priority Areas for Conservation (PACs)

Habitat Disturbance Relative Density by MT Core



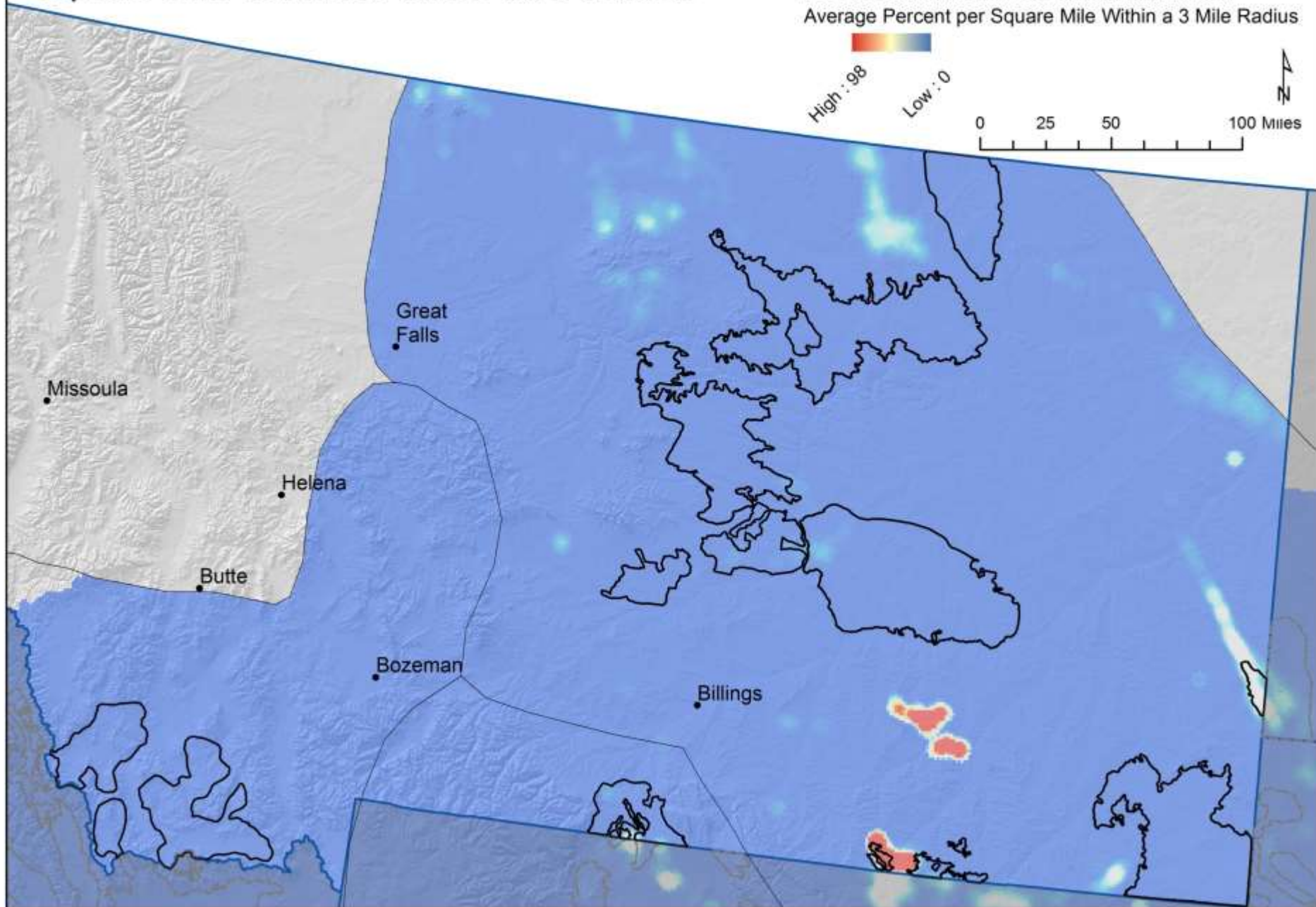
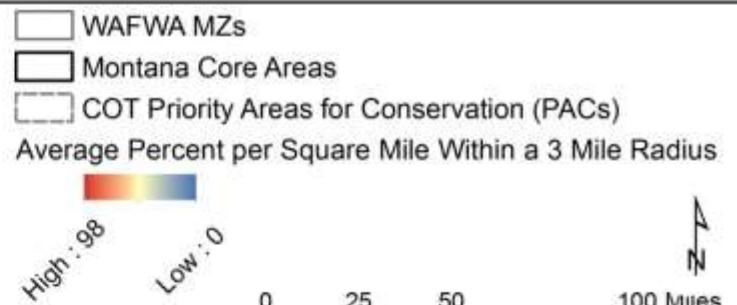
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

0 25 50 100 Miles





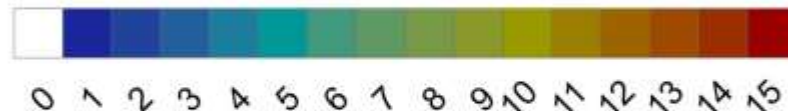
# Average Percent Energy Footprint per Square Mile Within a Three Mile Radius



# Producing Oil and Gas Development Related Wells: Relative Density

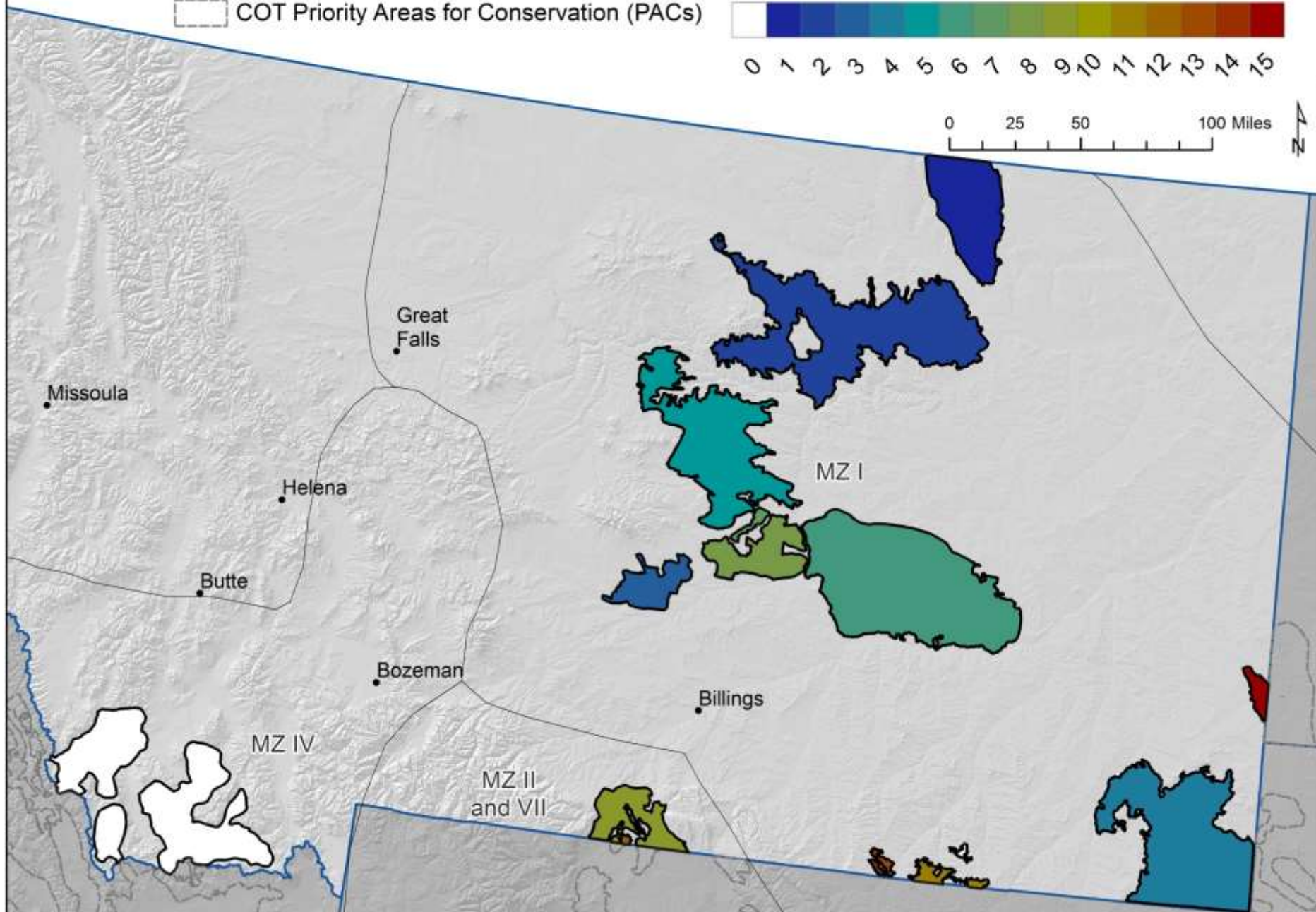
- Montana Core Areas
- COT Priority Areas for Conservation (PACs)

Oil and Gas Well Relative Density by MT Core



0 25 50 100 Miles

North





# Disturbance conclusions

- Threats operate cumulatively (no silver bullet) and synergistically to remove and degrade sage-grouse habitat
- Threats are not equally distributed across the landscape
- Three of the fundamental characteristics of the sagebrush biome that have been altered from presettlement conditions include
  1. the total area of sagebrush shrubland has been reduced;
  2. the composition and structure of the vegetation and soils in sagebrush communities have been changed
  3. fragmentation by anthropogenic features isolate populations by restricting movements or degrading habitat
- Areas with the highest densities of birds have the lowest densities of disturbance
  - Disturbance outside of core areas is higher, therefore habitat enhancement with reclamation is likely needed to increase bird density



# Questions?

